



1550-SPL

CLEAN VERSION

CLAIMS

We claim:

1. A structure, comprising:
  - 2 a plurality of cells of a cured resinous material, each cell being joined to at least one other cell.
  - 1 2. The structure according to claim 1, wherein the cells are solid.
  - 1 3. The structure according to claim 1, wherein the cells are hollow.

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  - 1 4. The structure according to claim 3, wherein the hollow cells are filled with fluid.
  - 1 *B1* 5. The structure according to claim 4, wherein the fluid is a gas.
  - 1 6. The structure according to claim 4, wherein the fluid is a liquid.

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  - 1 7. The structure according to claim 1, wherein the resinous material comprises an epoxy curable with ultraviolet radiation.
  - 1 8. The structure according to claim 4, wherein an interior of the cells has a fluid pressure substantially similar to an ambient pressure external to the cells.
  - 1 9. The structure according to claim 1, wherein the cells all have a similar size.
  - 1 10. The structure according to claim 1, wherein the cells are joined together to form a wall of a tubular structure having continuous walls.

1           11. The structure according to claim 1, wherein the cells are arranged in a plurality of  
2 parallel planes.

1           12. The structure according to claim 11, wherein cells in plurality of adjacent planes  
2 are arranged in different positions orthogonal to the planes.

1           13. The structure according to claim 11, wherein the cells in a plurality of adjacent  
2 planes are aligned in a direction perpendicular to the planes.

1           14. The structure according to claim 11, wherein the number of cells in each plane  
2 differs.

1           15. A method of forming a structure, the method comprising:  
2           forming a plurality of individual cells each comprising a mass of uncured resin;  
3           contacting some of the cells with others; and  
4           curing the resin.

1           16. The method according to claim 15, further comprising:  
2           injecting fluid into the masses of uncured resin to inflate the cells of resin.

1           17. The method according to claim 16, wherein the fluid is a liquid.

1           18. The method according to claim 16, wherein the fluid is a gas.

1           19. The method according to claim 17, further comprising:  
2           solidifying the liquid after injecting it into the cells.

- 1        20. The method according to claim 15, wherein the structure is formed by  
2 sequentially forming the cells in a plurality of planes and joining cells in each plane to cells in  
3 an adjacent previously formed plane of cells.
  
- 1        21. The method according to claim 20, wherein the number of cells formed in each  
2 plane differs.
  
- 1        22. The method according to claim 20, wherein cells in a plurality of adjacent planes  
2 are arranged in different positions orthogonal to the planes.
  
- 1        23. The method according to claim 20, wherein cells in a plurality of adjacent planes  
2 are aligned in a direction perpendicular to the planes.
  
- 1        24. The method according to claim 16, further comprising:  
2            evacuating the fluid from the interior of the cells after curing the resin.
  
- 1        25. The method according to claim 24, further comprising:  
2            injecting another fluid into the cells after evacuating the fluid utilized in inflating the  
3            cells.
  
- 1        26. The method according to claim 25, wherein the fluid is a gas.
  
- 1        27. The method according to claim 25, wherein the fluid is a liquid.
  
- 1        28. The method according to claim 27, further comprising:  
2            solidifying the liquid after injecting into the inflated cell.
  
- 1        29. The method according to claim 24, wherein the fluid is evacuated until an interior  
2            of the cells has a gas pressure substantially similar to an ambient pressure external to the cells.

1           30. The method according to claim 25, wherein the other fluid is injected into the  
2 cells until an interior of the cells has a gas pressure substantially similar to an ambient  
3 pressure external to the cells.

1           31. The method according to claim 15, wherein forming the cells of uncured resin  
2 comprises:  
3           feeding the uncured resin through a plurality of resin flow apertures in a plate.

1           32. The method according to claim 15, wherein all of the cells are formed of a similar  
2 size.

1           33. The method according to claim 15, wherein curing the resin comprises exposing  
2 the resin to at least one of ultraviolet radiation, heat, visible light, an electron beam, and  
3 microwave radiation.

1           34. An apparatus for creating a structure comprising a plurality of cells of cured  
2 resinous material, the apparatus comprising:  
3           a plurality of resin flow apertures arranged to permit cells formed at one aperture to  
4 contact cells formed at directly adjacent apertures; and  
5           a resin flow control member arranged in each resin flow aperture and operable to  
6 control a flow of resin from the resin flow apertures.

- 1        35. The apparatus according to claim 34, further comprising:
  - 2            a liquid injection port arranged in each resin flow aperture for injecting liquid into a
  - 3            cell of uncured resin flowing out of the resin flow aperture to inflate the cell; and
  - 4            a liquid flow control member operable to control a flow of liquid through the port.
- 1        36. The apparatus according to claim 35, wherein the liquid comprises gas.
- 1        37. The apparatus according to claim 35, wherein the liquid comprises a fluid.
- 1        38. The apparatus according to claim 34, further comprising:
  - 2            a forming plate that the resin flow apertures are formed through.
- 1        39. The apparatus according to claim 34, further comprising:
  - 2            at least one cell-retaining member for retaining the cells after curing of the resinous
  - 3            material.
- 1        40. The apparatus according to claim 34, further comprising:
  - 2            a source of energy for curing the uncured resin.
- 1        41. The apparatus according to claim 40, wherein the energy source comprises at least
  - 2            one of a source of ultraviolet radiation, a heat source, a source of visible light, an electron
  - 3            beam source, and a source of microwave radiation.
- 1        42. The apparatus according to claim 34, wherein the resin flow control member
  - 2            comprises a shutter valve.
- 1        43. The apparatus according to claim 34, wherein a position of the resin flow
  - 2            aperture is alterable.

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1           44.     The apparatus according to claim 34, wherein the apparatus form cells having a  
2       substantially uniform size

1           45.     A structure comprising:

2                a plurality of groups of cells of cured resinous material, each group of cells  
3       being joined to at least one other group of cells and each cell being joined to at least one other  
4       cell.

1           46.     The structure according to claim 45, wherein the cells in each group are co-  
2       planar.

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1           47.     The structure according to claim 45, wherein the cells within each group have  
2       a uniform size.

1           48.     The structure according to claim 45, wherein the cells among the groups have a  
2       uniform size.